I. Amendments to the Specification:

Please replace the title with the following amended title:

RECEIVER HAVING A FUNCTION TO TUNE AND SET A CHANNEL AND CHANNEL SETUP METHOD

Please replace the paragraph beginning on page 1, line 5 with the following amended paragraph:

An analogue broadcast television receiver or a digital broadcast television receiver stores receivable channel information as channel map data in, for example, a non-volatile memory. A desired channel is tuned from among stored receivable channels by up/down tuning of channels. However, the receivable channel information is not included in the channel map data when a power source is supplied to the television receiver at the first ~~setout~~ set-up. To include the receivable channel information in the channel map data, at a first channel setup operation is carried out in which each channel is tuned repeatedly over the predetermined frequency band range assigned as the television broadcast frequency band from the minimum frequency channel to the maximum frequency channel to store the channel information of the receivable channels in a non-volatile memory as the channel map data, and then the stored channel map is used for, for example, up/down tuning of a channel. Such conventional prior art is disclosed in, for example, Japanese Patent Laid-Open No. 2002-247460, Japanese Patent Laid-Open No. 2000-59180, Japanese Patent Laid-Open No. 2002-218335, and Japanese Patent Laid-Open No. 2002-344829.

Please replace the paragraphs beginning on page 2, line 19 through page 3, line 8 with the following amended paragraphs:

The above-mentioned trouble is apt to occur when a ~~potable~~ portable antenna, namely an indoor simple antenna, is used. Particularly, a ~~potable~~ portable antenna is used more popularly for digital broadcast in which S/N scarcely affects the image with low ghost and electric field than for analogue broadcast. In this case, because the reception level is unstable due to radio wave fluctuation depending on the location and surrounding obstruction of the ~~potable~~ portable antenna and meteorological condition, the user can get desired channels only partially at the first channel setup, even though desired channels are being broadcasted. The user is required to carry out channel setup repeatedly many times to get all the desired channels.

The same is true for the ~~potable~~ portable liquid crystal television receiver provided with a small liquid crystal display panel of, for example, five inches and a small antenna.

Please replace the paragraph beginning on page 3, line 20 with the following amended paragraph:

In the case of analogue broadcast, the broadcast reception frequency to be received corresponds one-to-one to the channel, and as a matter of course it is possible to tune a desired channel directly by using a numeric key. On the other hand, in the case of digital broadcast, for example, ATSC of USA employs X-Y type representation as the channel representation (referred to as logical channel hereinafter) of the broadcast program wherein X denotes the number of major channels and Y denotes the number of minor channels. Hence, a broadcast wave of one reception frequency includes a plurality of ~~multiplied~~ multiplexed broadcast programs, and the logical channel X-Y of each broadcast program among the plurality of broadcast programs is different from each others. As described hereinabove, the logical channel number does not

correspond one-to-one to the reception frequency. It is difficult to receive a desired broadcast program directly based on a logical channel number that indicates the broadcast program. To receive a desired broadcast program, it is required to form a channel map, namely corresponding table that lists the received reception frequency and the logical channel number for tuning. The channel like as analogue channel in which the reception frequency corresponds one-to-one to the channel number is referred as physical channel hereinafter for differentiation from the logical channel.

Please replace the paragraph beginning on page 5, line 2 with the following amended paragraph:

To solve the above-mentioned problem, the present invention provides a television receiver in which channels having broadcast signals the existence of which has already been stored are skippingly scanned in following channel setup and only channels having new channel information are stored additionally during the channel setup for setting up channels to be tuned by way of channel ~~up-down~~ up/down tuning.

Please replace the paragraph beginning on page 6, line 20 with the following amended paragraph:

While we have shown and described several embodiments in accordance with our invention, it should be understood that disclosed embodiments are susceptible of changes and modification without departing from the scope of the invention. Therefore, we do not intend to be bound by the details shown and described herein but intend to cover all such changes and modifications a fall within the ~~amabit~~ ambit of the appended claims.

Please replace the paragraphs beginning on page 7, line 15 through page 8, line 1 with the following amended paragraphs:

Analogue broadcast involves only physical channels. On the other hand, ATSC terrestrial broadcast involves logical channels that correspond one-to-one to physical channels. The logical channel given with Major channel and Minor channel that are ~~multiplied~~ multiplexed in one physical channel, and each logical channel provides different broadcast programs for broadcasting.

A Major channel number and a Minor channel number are assigned arbitrarily by broadcasting station side, and these numbers included in PSI data [[is]] are broadcasted. Therefore, it is required to analyze the PSI data at first to recognize the Major channel number and Minor channel number and to recognize other necessary data.

Please replace the paragraph beginning on page 8, line 18 with the following amended paragraph:

PAT includes a program number that indicates the number of broadcast programs included in one physical channel (namely, total channel number of the logical channel), and the number of broadcast programs included in a received physical channel is found by analyzing the PAT. VCT ~~include~~ includes Major channel number and Minor channel number of all the programs included in a received physical channel, and the logical channel number information is found by analyzing the VCT. The details are described in Table 4.2 of USA ATSC Standard A/65.

Please replace the paragraph beginning on page 9, line 7 with the following amended paragraph:

FIG. 6 shows an exemplary reception level of a broadcast channel. In FIG. 6, a vertical bar shows a reception level of each frequency band for each broadcast channel, and χ indicates reception limit level on which a horizontal sync signal of an image signal included in a broadcast wave of analogue broadcast is detectable and the broadcast wave is judged to be receivable. In the case of terrestrial digital television broadcast according to digital broadcast system, χ indicates reception limit level on which a segment sync signal showing reception of effective digital broadcast is detectable. ○ shows that a channel is judged to be being received as a broadcast wave and × shows that a channel is judged to be being not received as a broadcast wave. Channels with ○ in FIG. 6 are judged to be being broadcasted and these channels are set so as not to be skipped in channel ~~up-down~~ up/down tuning. Because channel 7 has scarce allowance to the limit reception level, the broadcast wave reception fluctuates depending on flying of an aircraft, meteorological condition, or antenna angle/direction change due to wind. If the reception level falls down exceeding the limit reception level χ due to fluctuation, channel setup is carried out so as to skip this channel at that time.

Please replace the paragraph beginning on page 11, line 11 with the following amended paragraph:

The tuning controller 6 of the TV microcomputer 3 control the sub-microcomputer 54, and the sub-microcomputer 54 controls the DTV tuner 5 for tuning to obtain the detected information of the segment sync signal specified according to ATSC from the 8-VSB demodulator 53. Furthermore, the sub-microcomputer 54 controls the DEMUX 61 to extract

image data and audio data of a desired broadcast program, and as required, stores tuning setting information supplied from the PSI processor 63 in a [[flush]] flash memory 52 and controls the [[flush]] flash memory 52 to read out the tuning setting information.

Please replace the paragraph beginning on page 12, line 13 with the following amended paragraph:

The sub-microcomputer 54 clears the channel map data in the [[flush]] flash memory 52 in S101. Next, the DTV tuner 5 tunes the minimum physical channel in S102 and judges whether a segment sync signal specified according to ATSC, which arises from a broadcast signal, is detected or not based on the demodulation result of the 8-VSB demodulator 53 in S103. If the segment sync signal is not detected, the sequence proceeds to S104. Timeout 1 that involves whether a predetermined time T1 elapses or not is judged in S104, and if the timeout 1 is judged to be NO, the sequence returns to S103 to continue detection of segment sync signal. On the other hand, if the timeout 1 is judged to be YES, the sequence proceeds to S204.

Please replace the paragraph beginning on page 13, line 10 with the following amended paragraph:

If program number N can be obtained in S106, the sub-microcomputer 54 judges whether the logical channel information is obtained or not based on the VCT analysis in S108. If YES result is obtained, the sequence proceeds to S110. If NO result is obtained, the physical channel number is assigned as Major channel number and Minor channel number is judged to be in a range from 1 to the program number N in S109, and the sequence proceeds to S110. In S110, the physical channel number, Major channel number, and Minor channel number obtained as

described hereinabove are stored in the [[flush]] flash memory 52, and whether the execution history value is 1 or a number larger than 1 is judged in S204. Because the execution history value is 0 when the receiver is subjected to the first channel setup operation, whether the current physical channel is the maximum channel or not is judged in S111.

Please replace the paragraph beginning on page 14, line 11 with the following amended paragraph:

If the channel setup operation is not first channel setup operation, the execution history value of ~~a number larger than~~ 1 or larger is obtained in S201. Therefore, the sequence proceeds to S202. In S202, the sub-microcomputer 54 refers a channel map stored in the [[flush]] flash memory 52 formed before to form a different unregistered channel map that is a channel map in which unregistered channels skipped in previous channel ~~up-down tuning~~ setup operation are listed, for example, in the ascending order, and the unregistered channel map is stored in the [[flush]] flash memory 52. In S203, an unregistered minimum physical channel is searched on the unregistered channel map. The sub-microcomputer receives the unregistered minimum physical channel, and the sequence proceeds to S103 for segment sync detection judgment. After that, the sequence proceeds to S204 through the same route.

Please replace the paragraphs beginning on page 15, line 17 through page 16, line 4 with the following amended paragraphs:

Because the execution history value is 1 or larger if this channel setup operation is not the first channel setup operation, the judgment in S204 is YES this time and the sequence proceeds to S206. In S206, the sub-microcomputer 54 refers the unregistered channel map stored in the

[[flush]] flash memory 52 to find out the unregistered maximum physical channel from among unregistered physical channels. In S207, whether the current physical channel is the unregistered maximum physical channel or not is checked. If NO result is obtained, the next higher order unregistered physical channel in the unregistered channel map is received in S208 and the sequence returns to S103. If YES result is obtained in S207, YES means that channel setup operation of the unregistered physical channels in the unregistered channel map has been completed. Therefore, the unregistered channel map is cleared in S209, 1 is added to the execution history value in S205, and the sequence proceeds to the end.

FIG. 3 is an exemplary conceptual diagram of a channel map formed in the [[flush]] flash memory 52 by executing the channel setup operation shown in FIG. 1 in the case of the ATSC terrestrial broadcast receiver shown in FIG. 2.

In the example shown in FIG. 3, physical channels 2, 6, 12, 14, and 61 are registered, and other physical channels are not registered. The CPU 10 of the TV microcomputer 3 controls the sub-microcomputer 54 through the tuning controller 6 to thereby control the OSD generator 8 with reference to the channel map data formed in the [[flush]] flash memory 52. As the result, Major channels, Minor channels, and scan ON/OFF setting value are displayed on the display 13 as a channel map. For example, a first address of the [[flush]] flash memory 52 is displayed as 2-1 ON.

Please replace the paragraphs beginning on page 16, line 9 through page 17, line 10 with the following amended paragraphs:

When channel ~~up-down~~ up/down tuning is carried out, the TV microcomputer 3 directs the sub-microcomputer 54 to ~~up-down~~ tune the channel up/down by means of channel ~~up-down~~

up/down tuning direction by use of a user interface such as remote controller command or switch operation though not shown in FIG. 2. The sub-microcomputer 54 controls the DTV tuner 5 through the tuning controller 6 to tune a logical channel of ON scan setting next to the current Major-Minor channel with reference to the channel map data stored in the [[flush]] flash memory 52. For example, when the channel is to be up during viewing 6-4 channel in the channel map shown in FIG. 3, the CPU of the TV microcomputer 3 directs the sub-microcomputer 54 to up the channel through the tuning controller 6. The sub-microcomputer 54 controls the DTV tuner 5 to tune the physical channel 12 with reference to the channel map data stored in the [[flush]] flash memory 52 so as to tune 6-5 channel that is listed at the next higher order to 6-4 channel.

FIG. 5 shows another exemplary conceptual channel map diagram different from that shown in FIG. 3. Only received channel information is stored in FIG. 3, but the channel information is stored for every physical channel in the [[flush]] flash memory 52. In FIG. 5, for example, the address 1 corresponds to the logical channel 2-1 broadcast program in the physical channel 2 and scan setting is ON so that this broadcast program is tuned in channel ~~up-down~~ up/down tuning. The physical channel 3 of the address 3 corresponds to no broadcast program, and scan setting is OFF so that this broadcast program is skipped in channel ~~up-down~~ up/down tuning.

Please replace the paragraph beginning on page 17, line 25 with the following amended paragraph:

Furthermore, in application of the present invention to a television receiver having antenna direction/angle presetting function, for example, in application of the present invention to an antenna having two antenna setting modes A and B, the first channel setup is carried out in

mode A and then next channel setup is carried out in mode B to register unregistered physical channels. As the result, broadcast signals coming [[form]] from at least two directions can be registered surely on the channel map advantageously. As a matter of course, the present invention can be applied to the case in which antenna input is switched manually.

Please replace the paragraph beginning on page 19, line 10 with the following amended paragraph:

According to the present invention, the time required for the second and following channel setup operation is shortened in the channel setup operation of a television receiver for forming a channel map when channel ~~up-down~~ up/down tuning is carried out.

Please replace the paragraph beginning on page 22, line 3 with the following amended paragraph:

The sequence proceeds to S304 when timeout comes in S104 or S107, and whether the current channel is the current registered channel or not is judged with reference to the current registered channel map formed in S301. If the current channel is judged to be the current registered channel in S304, the sequence proceeds to S305 in which 1 is added to the number of no reception T, and the sequence proceeds to S306. If the number of no reception T exceeds 5 in S306, the sequence proceeds to S308, and the channel information of the current channel is erased from the channel map, and then the sequence proceeds to S111. On the other hand if the number of no reception T does not ~~exceeds~~ exceed 5 in S306, the sequence proceeds to S307, in which the number of no reception T is stored in the channel map, and then the sequence proceeds to S111. If NO result is obtained in S304, the sequence proceeds to S111.

Please replace the paragraph beginning on page 22, line 22 with the following amended paragraph:

FIG. 8 is an exemplary conceptual diagram of a channel map formed in the [[flush]] flash memory 52 in the channel setup operation shown in FIG. 7 for an ATSC terrestrial broadcast receiver shown in FIG. 2.

Please replace the paragraph beginning on page 24, line 10 with the following amended paragraph:

In detail, the judgment information for judging the existence of the registered channel information that indicates the existence of the broadcast signal on the channel map is stored in the [[flush]] flash memory 52 in S205 shown in FIG. 7, and the judgment information is read out from the [[flush]] flash memory 52 in S201 in the next channel setup. If the judgment information indicates the existence of the registered channel information that indicates the existence of the broadcast signal, the sequence proceeds to S301.